

we may never be called on to make original discoveries or have the opportunity. But as you proceed I trust that you will realise that the method which you are learning to apply is one which can be made use of in all your work—that the course has a broad educational value far transcending its special value as an introduction to physical science.

Lastly, I should like to take this opportunity of calling attention to the very great value to girls, as well as to boys, of teaching such as you are about to give. I fear that much that girls are being taught under the guise of domestic economy is of slight value educationally or otherwise, and that they are but having imparted to them little tit-bits of information which they are as likely as not to misapply. Nothing is done by way of increasing their intelligence and forming their characters. Lessons which would lead them to be observant, thoughtful and, above all, exact—lessons in method—would be of far higher and abiding value. They would then carry out their household functions with greater ease; there would be far less waste; less unhealthiness; far more comfort. I believe the need for such training to be indeed far greater in the case of girls than in that of boys. Boys are naturally apt in many ways, and even if neglected at school, perforce develop when they go out into the world; but girls are of a different disposition, and rarely seem to spontaneously acquire the mental habits which a training in scientific method can confer, the possession of which would be of inestimable value to them. Extraordinarily little has been done as yet on their behalf, and they have been cruelly sacrificed at examinations—for which, unfortunately, they appear themselves to have an insatiable natural appetite. It is to be hoped that the new Board will give the most serious attention to this matter, and that it will take steps to secure the teaching of scientific method in all the schools under its charge, whether boys' schools or girls' schools. Unhealthy buildings have attracted much attention; but the existence of a far more serious evil—the absence of healthy teaching suited to the times—has not even been noticed.

In these remarks, I have been able but briefly to bring before you a number of questions of importance—it must rest with you to seriously study the subject. It is a subject worth hard study, which will afford infinite opportunity and infinite satisfaction to the earnest worker.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following examiners for the Natural Sciences Tripos were appointed on October 25. Physics: L. R. Wilberforce and Prof. G. F. Fitzgerald, F.R.S. Chemistry: W. J. Sell and Prof. W. Ramsay, F.R.S. Mineralogy: Prof. Lewis and H. A. Miers. Geology: P. Lake and Prof. G. A. J. Cole. Botany: Prof. F. W. Oliver, F.R.S., and W. Gardiner, F.R.S. Zoology: W. Bateson, F.R.S., and Prof. S. J. Hickson. Human Anatomy: Prof. A. Macalister, F.R.S., and Dr. H. D. Rolleston. Physiology: W. B. Hardy and Prof. E. A. Schäfer, F.R.S.

Prof. Bradbury delivered his inaugural lecture, as Downing Professor, on Wednesday, October 24, before a large audience. The subject was "Pharmacology and Therapeutics."

The University Lecturer in Geography, Mr. Yule Oldham, delivered a public lecture on the evening of October 24, on "A New Discovery of America." He will give during the present and the Lent terms a course on the "History of Geographical Discovery," on Thursdays at noon in the Chemical Theatre.

An election to the Royal Geographical Society's Studentship of £100 will be held in the Lent Term. The studentship is open to members of the University who have attended the lectures on Geography.

Of the Freshmen entered this term, 137 have announced their intention to study medicine at the University.

The period of five years for which Dr. Donald Macalister was elected as the University member of the General Medical Council expires on November 13. The Vice-Chancellor gives notice that an election will be held in the Senate House on Friday, November 9, from 2.30 to 3.0, at which all members of the Senate may vote. Dr. Macalister is eligible for re-appointment.

Dr. Charles Rieu, late keeper of the Oriental MSS. in the British Museum, has been elected Sir Thomas Adams Professor of Arabic in succession to Prof. Robertson Smith.

The Council of the Senate have issued a second report on special degrees (Lit.B. and Sc.B) for advanced study and research, in which they call attention to the steps in the same direction taken by the University of Oxford, the Scottish Universities, the Gresham (London) University Commissioners, and the University of Harvard. They propose that, as the bearings of the subject have greatly widened since their first report on post-graduate study, the whole question should be referred to a special Syndicate, with power to confer with other bodies and with the several teachers concerned.

WE have received an advance copy of the report on the work of the Examinations Department of the City and Guilds of London Institute for the session 1893-94. During this session the number of classes registered by the Institute was 853, viz. 701 in Technology and 152 in Manual Training. The total number of students in attendance was 25,718, viz. 22,703 in technology and 3015 in manual training. At the examinations this year, 11,631 candidates presented themselves, being 1377 in excess of the number examined last year. The examiners for the Institute, like those of the Department of Science and Art, find that the Honours papers are the least satisfactory. It is pointed out that Honours students should be taught in special Honours classes. To quote the report:—

"It often happens that facilities for higher or advanced instruction are not provided at the schools, and that the candidates for Honours seeking further teaching are only able to attend the ordinary class a second session. This absence of higher instruction is a matter to be carefully considered by the Technical Instruction Committees of County Councils. Elementary technical instruction is of little value unless it encourages the student to seek further knowledge; and efforts should be made, even where the number of students is small, either to establish advanced classes, or to enable students to pursue their studies at other institutions where such advanced instruction may be obtained."

MR. HERBERT TOMLINSON, F.R.S., has been appointed Principal of the South-West London Polytechnic Institute, now in course of erection in Chelsea. The institute, which will be of the same dimensions and be conducted on somewhat the same lines as the Battersea Polytechnic, will, it is hoped, be finished by April next.

It is announced that Dr. William Peterson, who for the last twelve years has been the Principal of University College, Dundee, has been appointed to the post of Principal of McGill University, Montreal, vacated by Sir William Dawson, F.R.S., more than a year ago.

SCIENTIFIC SERIALS

American Journal of Science, October.—The standardisation of potassium permanganate in iron analysis, by Charlotte F. Roberts. A simple and rapid method for standardising a permanganate solution is to determine its strength, first, by comparison with electrolytic iron, and then by immediate titration with ferric chloride to determine the exact amount of iron in each cubic centimetre of the latter solution. This being ascertained, the ferric chloride solution can be employed at any time for the standardisation of potassium permanganate.—The detection and approximate estimation of minute quantities of arsenic in copper, by F. A. Gooch and H. P. Moseley. This is a modification of Sanger's process for wall-papers, whose application is rendered difficult by the fact that the presence of copper in the Marsh generator holds back the arsenic. The new process is based upon the simultaneous action of strong hydrochloric acid and potassium bromide upon the salt of arsenic.—Wave-lengths of electricity in iron wires, by C. E. St. John. A Lecher wire system was used in which the discs at the end towards the induction coil were left out, so as to obtain a form depending more directly upon the principle of electrical resonance. The indicator used was a bolometer as adapted by Rubens. It was found that the self-induction of iron circuits is greater than that of similar copper circuits under very rapid electric oscillations (115 million reversals per second). The difference in self-induction varies from 3.4 to 4.3 per cent., and increases with decreasing diameters. The increase in self-induction produces greater damping and a shortening of the wave-length of 1.5 to 2 per cent. The permeability

of annealed iron wires under this rate of alternation is about 385. For oscillations of the same period, the wave-length along parallel copper wires varies directly with the diameter of the wires, the maximum difference observed being 5 per cent. with wires of 0.03915 and 0.1201 cm. diameter respectively.—The present status of high-temperature research, by Carl Barus. To clear away the anomalies now existing in high temperature data, either the boiling point of zinc must come down from 930° to 905°, or else the melting points of gold, silver, and copper must move up 30° or 40°, or both must move towards each other by corresponding amounts.—The recent eruption in the crater of Kilauea, by L. A. Thurston. This is a description of the subsidence of the lava lake on July 11, when its level fell 250 feet.—On solutions of metallic silver, by M. Carey Lea. The solutions previously described are all colloidal, and at the same time absolutely transparent.

Wiedemann's Annalen der Physik und Chemie, No. 10.—On pure water, by F. Kohlrausch and A. Heydweil. (See Notes.)—Magnetic experimental investigations, by Carl Fromme. This paper deals with the self-induction and the electrostatic capacity of wire coils and their influence upon magnetic phenomena. Coils with bifilar winding are free from self-induction, and also from electrostatic capacity as long as their resistance does not exceed 1000 ohms. At 2000 ohms their capacity is already very considerable. Coils wound by Chaperon's method, *i.e.* with the direction of winding changing with each round, are perfectly free from capacity, and their self-induction is negligible. It is therefore quite feasible to determine their resistance by the alternate current method.—Examination of the Ketteler-Helmholtz dispersion formula, by Heinrich Rubens. The electromagnetic theory of dispersion, as developed by Herr von Helmholtz, is in complete accordance with the results obtained in the case of fluorspar, quartz, rock-salt, sylvine, and one of the heavy Jena silicate-flint glasses. The agreement extends over the whole region of the spectrum investigated, comprising $5\frac{1}{2}$ octaves.—Bolometric investigations, by F. Paschen. This is a reply to Herr Ångström's criticism of his work on the absorption spectrum of carbonic anhydride.—On the infra-red dispersion of fluorspar, by F. Paschen. The spectrum of the fluorspar prism employed was calibrated by Langley's grating method. The best source of radiation was found to be a small piece of platinum foil coated with oxide of iron. The region of the spectrum examined extended from $0.8840\ \mu$ to $9.4291\ \mu$, and the corresponding refractive indices ranged from 1.42996 to 1.31612.—Change of volume during melting, by Max Toepler. The author investigated the number of cubic cm. by which a gramme of various elements expanded or contracted during melting. The list included eleven metals and five non-metals. He found that the coefficient of expansion of the elements in the solid state, and their change of volume during melting, show a definite relation to each other.—The depression of the freezing-point of a solvent by electrolyte, by Harry C. Jones. In the case of a solution of phosphoric acid of concentrations 0.077 and 0.146, the numbers obtained, 2.52 and 2.31, are in fair accordance with those obtained by Arrhenius, but not with those of Loomis.

SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, October 3.—The Right Hon. Lord Walsingham, F.R.S., Vice-president, in the chair.—Mr. W. F. H. Blandford exhibited specimens of a sand-flea, chigoe or nigua, received from Mr. Szigetváry, of the Imperial Maritime Customs, China, who had found them in the ears of sewer-rats trapped at Ningpo. Mr. Blandford stated that the species was allied to, but not identical with, the American species, *Sarcopsylla fenestrans*, L., one of the most troublesome pests in Tropical America and the West Indies to man and various domestic and wild animals, the female burrowing into the skin, usually of the feet, but also of any other accessible region. He said that the distribution of the chigoe was recorded over Tropical America and the Antilles from 30° north to 30° south, and of late years it had established itself in Angola, Loango, and the Congo. Colonel Swinhoe, Mr. McLachlan, Lord Walsingham, Mr. Champion, Mr. J. J. Walker, Mr. Barrett, and others, took part in the discussion which ensued.—Mr. F. C. Adams exhibited a specimen of *Mallota cristatoides*, a species

of Diptera new to Britain, taken by himself in the New Forest on July 20 last. He said that the species had been identified by Mr. Austen, of the British Museum, and that he had presented the specimen to the National Collection. Mr. Verrall made some remarks on the species and on the distribution of several allied species in the United Kingdom. Lord Walsingham, as a trustee of the British Museum, expressed his satisfaction at the presentation of the specimen to that institution.—Mr. Tutt exhibited specimens of a form of *Zygana exulans*, well scaled, and with the nervures and forelegs of a decidedly orange colour, collected during the last week in July by Dr. Chapman in the La Grave district of the Alps, at a considerable elevation; also specimens of the same species taken by Dr. Chapman near Cogne, and others from the Grison Valley, which were less well scaled. He also exhibited Scotch specimens for comparison, and stated that he was of opinion that the latter were probably as thickly scaled as the continental ones, but that, owing to the differences in the climate of Scotland and Switzerland, collectors had fewer opportunities of getting the Scotch specimens in good condition.—Mr. P. M. Bright exhibited a remarkable series of varieties of *Arctia menthastris* from N. Scotland, also series of *Liparis monacha* (including dark varieties) and *Boarmia roboraria* from the New Forest; *Zygana exulans*, from Braemar; *Noctua glareosa*, from Montrose and the Shetlands; *Agrotis pyrophila*, from the Isle of Portland, and Pitcaple, N.B.; red varieties of *Tenocampa gracilis*; and a specimen of *Sterrhia sacraria*, taken at light, at Mudeford, in October, 1893; also living larvæ of *Eulefia cribrum*.—Mr. J. J. Walker exhibited a living specimen of a large species of Pulex, which he believed to be *Hystricopsylla talpa*, Curtis, taken at Hartlip, Kent. Mr. Verrall and the chairman made some remarks on this and allied species.—Mr. K. J. Morton communicated a paper, entitled "Palæarctic Nemouræ."—Lord Walsingham read a paper, entitled "A Catalogue of the Pterophoridaæ, Tortricidæ, and Tineidæ of the Madeira Islands, with Notes and Descriptions of New Species." In this paper sixty-six species of Lepidoptera belonging to these families were recorded as occurring in the Madeiras, of which thirty were noticed as peculiar to the Islands, twelve as common to the Madeiras and Canaries, of which two were not known as occurring elsewhere, and one extends its range only to North Africa. Over thirty species were added to the list, and one new genus, seven new species, and two new varieties were described. Mr. Jacoby and Mr. Bethune-Baker made some remarks on the species and their geographical distribution.—Mr. Blandford read a paper, entitled "A Supplementary Note on the Scolytidæ of Japan, with a list of Species."

PARIS.

Academy of Sciences, October 15.—M. Lœwy in the chair.—The death of M. N. Pringsheim, on October 6, 1894, was announced to the Academy, and a short account of his work given by M. Bornet.—Determination, partly experimental and partly theoretical, of the inferior contraction of a bending fluid sheet, either depressed, submerged below, or adherent, on a weir having its up-river face vertical, by M. J. Boussinesq.—Observations of Gale's comet (1894, b) made with the great equatorial at Bordeaux Observatory by MM. G. Rayet, L. Picart, and F. Courty. A note by M. G. Rayet. The apparent positions of the comet on twenty-seven days between May 4 and July 31 are tabulated.—On the degree of incandescence of lamps, by M. A. Crova. The conclusions are given: (1) That the quantity of light emitted by a gas-burner per litre of gas used increases with the quantity of the combustible burnt per hour, whereas the degree of incandescence slightly diminishes, up to a maximum yield which should not be exceeded; (2) that, for lamps with incandescent substances, the maximum yield corresponds to the minimum amount of the combustible which must be burnt in order to obtain the maximum degree of incandescence.—Report on the memoir by M. Stieltjes, on "Researches on Continued Fractions." After a detailed consideration of the memoir, the report proceeds to say: "This work by M. Stieltjes is one of the most remarkable memoirs on analysis which has been written in late years."—Disappearance of the southern polar spot of Mars, by M. G. Bigourdan. The spot ceased to be visible on October 13.—First observations of the pendulum in the Alps of Dauphiny. The values obtained for the constant of gravitation are given below in column g_0 , for comparison the values calculated for each place at latitude ϕ from the formula $g = 9.78124(1 + 0.005243 \sin^2 \phi)$ are ap-